

CLAIMS

What is claimed is:

1. An automatic gain control comprising:
 - 5 a digital lowpass filter for filtering a series of digital samples generated by an analog-to-digital converter to generate a lowpass filtered digital sample series;
 - a power averager coupled to the digital lowpass
 - 10 filter for calculating an average power of the lowpass filtered digital sample series; and
 - a lookup table coupled to the power averager for setting a selectable gain of an amplifier coupled to the analog-to-digital converter as a function of the
 - 15 average power.

2. The automatic gain control of Claim 1 wherein the digital lowpass filter is an infinite impulse response digital lowpass filter.

3. The automatic gain control of Claim 2 wherein the infinite impulse response digital lowpass filter has a transfer function that may be expressed as:

$$H(z) = \frac{\sum_m b_m z^{-m}}{\sum_n a_n z^{-n}}$$

4. The automatic gain control of Claim 2 wherein the infinite impulse response digital lowpass
- 30 filter comprises:

a first sum function for receiving as input a series of digital samples and for generating a first sum;

average power within the dynamic range of the analog-to-digital converter.

1990-1991		1991-1992		1992-1993		1993-1994		1994-1995		1995-1996		1996-1997		1997-1998		1998-1999		1999-2000		2000-2001		2001-2002		2002-2003		2003-2004		2004-2005		2005-2006		2006-2007		2007-2008		2008-2009		2009-2010		2010-2011		2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2030-2031		2031-2032		2032-2033		2033-2034		2034-2035		2035-2036		2036-2037		2037-2038		2038-2039		2039-2040		2040-2041		2041-2042		2042-2043		2043-2044		2044-2045		2045-2046		2046-2047		2047-2048		2048-2049		2049-2050		2050-2051		2051-2052		2052-2053		2053-2054		2054-2055		2055-2056		2056-2057		2057-2058		2058-2059		2059-2060		2060-2061		2061-2062		2062-2063		2063-2064		2064-2065		2065-2066		2066-2067		2067-2068		2068-2069		2069-2070		2070-2071		2071-2072		2072-2073		2073-2074		2074-2075		2075-2076		2076-2077		2077-2078		2078-2079		2079-2080		2080-2081		2081-2082		2082-2083		2083-2084		2084-2085		2085-2086		2086-2087		2087-2088		2088-2089		2089-2090		2090-2091		2091-2092		2092-2093		2093-2094		2094-2095		2095-2096		2096-2097		2097-2098		2098-2099		2099-2100		2100-2101		2101-2102		2102-2103		2103-2104		2104-2105		2105-2106		2106-2107		2107-2108		2108-2109		2109-2110		2110-2111		2111-2112		2112-2113		2113-2114		2114-2115		2115-2116		2116-2117		2117-2118		2118-2119		2119-2120		2120-2121		2121-2122		2122-2123		2123-2124		2124-2125		2125-2126		2126-2127		2127-2128		2128-2129		2129-2130		2130-2131		2131-2132		2132-2133		2133-2134		2134-2135		2135-2136		2136-2137		2137-2138		2138-2139		2139-2140		2140-2141		2141-2142		2142-2143		2143-2144		2144-2145		2145-2146		2146-2147		2147-2148		2148-2149		2149-2150		2150-2151		2151-2152		2152-2153		2153-2154		2154-2155		2155-2156		2156-2157		2157-2158		2158-2159		2159-2160		2160-2161		2161-2162		2162-2163		2163-2164		2164-2165		2165-2166		2166-2167		2167-2168		2168-2169		2169-2170		2170-2171		2171-2172		2172-2173		2173-2174		2174-2175		2175-2176		2176-2177		2177-2178		2178-2179		2179-2180		2180-2181		2181-2182		2182-2183		2183-2184		2184-2185		2185-2186		2186-2187		2187-2188		2188-2189		2189-2190		2190-2191		2191-2192		2192-2193		2193-2194		2194-2195		2195-2196		2196-2197		2197-2198		2198-2199		2199-2200		2200-2201		2201-2202		2202-2203		2203-2204		2204-2205		2205-2206		2206-2207		2207-2208		2208-2209		2209-2210		2210-2211		2211-2212		2212-2213		2213-2214		2214-2215		2215-2216		2216-2217	
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8. A method for automatic gain control comprising the following steps:

amplifying a communications signal according to a
5 selectable gain to generate an amplified communications
signal;

digitizing the amplified communications signal to
generate a series of digital samples representative of
the amplified communications signal;

10 lowpass filtering the series of digital samples to
generate a lowpass filtered digital sample series;

calculating an average power of the lowpass
filtered digital sample series; and

15 setting the selectable gain of the amplifier as a
function of the average power.

9. The method of Claim 8 wherein the step of
lowpass filtering includes lowpass filtering by an
infinite impulse response digital lowpass filter.

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10. The method of Claim 9 wherein the
infinite impulse response digital lowpass filter has a
transfer function that may be expressed as:

$$H(z) = \frac{\sum_m b_m z^{-m}}{\sum_n a_n z^{-n}}.$$

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11. The method of Claim 9 wherein the
infinite impulse response digital lowpass filter
comprises: 12. of lowpass fil
half Nyquist i

30 a first sum function for receiving as input a
series of digital samples and for generating a first
sum;

a first sum register coupled to the first sum
function for storing the first sum;

a first unit delay coupled to the first sum register for delaying the first sum by one sample period to generate a first delayed sum;

12. The method of Claim 8 wherein the step of lowpass filtering attenuates frequencies between half Nyquist rate and Nyquist rate.

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Table 1. Demographic characteristics of the study population	
Age (years)	50.0 ± 10.0
Gender	
Male	50.0%
Female	50.0%
Education (years)	12.0 ± 2.0
Occupation	
Professional	30.0%
Managerial	20.0%
Technical	10.0%
Service	20.0%
Unemployed	20.0%
Marital status	
Married	70.0%
Single	10.0%
Divorced	10.0%
Widowed	10.0%
Religion	
Muslim	80.0%
Christian	10.0%
Hindu	10.0%
Buddhist	10.0%
Other	0.0%
Smoking status	
Smoker	20.0%
Non-smoker	80.0%
Alcohol consumption	
Alcohol consumer	10.0%
Non-alcohol consumer	90.0%
Family size	3.0 ± 1.0
Household income (USD/month)	1000.0 ± 500.0
Health insurance status	
Insured	80.0%
Uninsured	20.0%
Comorbidities	
Hypertension	30.0%
Diabetes	10.0%
Cholesterol	20.0%
Obesity	10.0%
Depression	10.0%
Other	0.0%